

# **INDOOR AIR QUALITY REASSESSMENT**

**EOHHS Service Center  
38 Industrial Park Road  
Plymouth, Massachusetts**



Prepared by:  
Massachusetts Department of Public Health  
Bureau of Environmental Health  
Indoor Air Quality Program  
December 2016

## Background

<b>Building:</b>	Executive Office of Health and Human Services (EOHHS) Service Center
<b>Address:</b>	38 Industrial Park Road, Plymouth, MA
<b>Division of Capital Asset Management and Maintenance (DCAMM) Project Manager:</b>	Lars Carlson
<b>Reason for Request:</b>	Post-occupancy assessment
<b>Date of Assessment:</b>	November 18, 2016
<b>Massachusetts Department of Public Health/Bureau of Environmental Health (MDPH/BEH) Staff Conducting Assessment:</b>	Cory Holmes, Environmental Analyst, Indoor Air Quality (IAQ) Program
<b>Building Description:</b>	Single-story newly constructed building that serves as office space for the Department of Developmental Services, Department of Mental Health and the Massachusetts Rehabilitation Commission.
<b>Building Population:</b>	Approximately 100 employees
<b>Windows:</b>	Not openable

## Methods

Please refer to the IAQ Manual for methods, sampling procedures, and interpretation of results (MDPH, 2015).

## IAQ Testing Results

The following is a summary of indoor air testing results (Table 1).

- ***Carbon dioxide levels*** were below 800 parts per million (ppm) in all areas assessed, indicating adequate fresh air in the space.
- ***Temperature*** was within or close to the recommended range of 70°F to 78°F in all areas assessed.
- ***Relative humidity*** was within or close to the recommended range of 40% to 60% in all areas assessed.

- ***Carbon monoxide*** levels were non-detectable in all areas assessed.
- ***Fine particulate matter (PM<sub>2.5</sub>)*** concentrations measured were below the National Ambient Air Quality Standard (NAAQS) level of 35 micrograms per cubic meter (µg/m<sup>3</sup>) in all areas assessed.

### **Ventilation**

Heating, ventilation and air conditioning (HVAC) is provided by rooftop air-handling units (AHUs, Picture 1). Conditioned air is delivered to occupied areas via louvered supply vents, and stale air is removed via return vents (Picture 2). The HVAC system is controlled by digital thermostats (Picture 3). The BEH recommends that the fan be set to the “on” setting to provide continuous circulation/filtration during occupied hours.

### **Microbial/Moisture Concerns**

No water-damaged materials were observed during the assessment. Plants were observed in several areas (Table 1). Plants can be a source of pollen and mold, which can be respiratory irritants to some individuals. Plants should be properly maintained and equipped with drip pans and should be located away from air diffusers to prevent the aerosolization of dirt, pollen, and mold.

### **Other IAQ Evaluations**

The offices were mostly carpeted. Carpets should be cleaned annually (or semi-annually in soiled/high traffic areas) in accordance with Institute of Inspection, Cleaning and Restoration Certification (IICRC) recommendations, (IICRC, 2012).

### **Conclusions/Recommendations**

Based on observations at the time of assessment, the following is recommended:

1. Operate supply and exhaust ventilation continuously in all areas during occupied periods.
2. Have the HVAC system balanced every 5 years in accordance with SMACNA recommendations (SMACNA, 1994).

3. For buildings in New England, periods of low relative humidity during the winter are often unavoidable. Therefore, scrupulous cleaning practices should be adopted to minimize common indoor air contaminants whose irritant effects can be enhanced when the relative humidity is low. To control for dusts, a high efficiency particulate arrestance (HEPA) filter equipped vacuum cleaner in conjunction with wet wiping of all surfaces is recommended. Avoid the use of feather dusters. Drinking water during the day can help ease some symptoms associated with a dry environment (throat and sinus irritations).
4. Keep plants in good condition, avoid overwatering, and remove from the airstream of heating and ventilation equipment.
5. Clean carpeting in accordance with IICRC recommendations (IICRC, 2012); annually (or semi-annually in soiled/high traffic areas).
6. Refer to resource manual and other related IAQ documents located on the MDPH's website for further building-wide evaluations and advice on maintaining public buildings. These documents are available at: <http://mass.gov/dph/iaq>.

## References

IICRC. 2012. Institute of Inspection, Cleaning and Restoration Certification. Carpet Cleaning: FAQ. Retrieved from <http://www.iicrc.org/consumers/care/carpet-cleaning>.

MDPH. 2015. Massachusetts Department of Public Health. Indoor Air Quality Manual: Chapters I-III. Available at: <http://www.mass.gov/eohhs/gov/departments/dph/programs/environmental-health/exposure-topics/iaq/iaq-manual/>.

SMACNA. 1994. HVAC Systems Commissioning Manual. 1<sup>st</sup> ed. Sheet Metal and Air Conditioning Contractors' National Association, Inc., Chantilly, VA.

**Picture 1**



**Rooftop air handling units**

**Picture 2**



**Supply (right) and return (left) vents**

**Picture 3**



**Digital Thermostat**

Location: EOHHS Service Center

Indoor Air Results

Address: 38 Industrial Park Road, Plymouth, MA

Table 1

Date: 11/18/2016

Location	Carbon Dioxide (ppm)	Carbon Monoxide (ppm)	Temp (°F)	Relative Humidity (%)	PM2.5 (µg/m <sup>3</sup> )	Occupants in Room	Windows Openable	Ventilation		Remarks
								Intake	Exhaust	
Background	396	ND	54	61	4					Sunny, clear skies
Lobby	600	ND	71	39	8	2	N	Y	Y	
Reception	599	ND	72	39	2	2	N	Y	Y	
103	526	ND	71	38	3	0	N	Y	Y	
105	528	ND	71	39	4	0	N	Y	Y	
113 Conference Room	543	ND	72	38	3	0	N	Y	Y	
114	545	ND	71	39	6	0	N	Y	Y	
115	536	ND	71	39	6	0	N	Y	Y	
116	534	ND	70	39	6	0	N	Y	Y	
117	523	ND	71	38	6	0	N	Y	Y	
118	552	ND	71	39	2	0	N	Y	Y	
120	568	ND	70	42	1	1	N	Y	Y	DO

ppm = parts per million

DO = door open

µg/m<sup>3</sup> = micrograms per cubic meter

ND = non-detect

**Comfort Guidelines**

Carbon Dioxide: < 800 ppm = preferred  
> 800 ppm = indicative of ventilation problems

Temperature: 70 - 78 °F  
Relative Humidity: 40 - 60%



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Indoor Air Results

Address: 38 Industrial Park Road, Plymouth, MA

Table 1 (continued)

Date: 11/18/2016

Location	Carbon Dioxide (ppm)	Carbon Monoxide (ppm)	Temp (°F)	Relative Humidity (%)	PM2.5 (µg/m <sup>3</sup> )	Occupants in Room	Windows Openable	Ventilation		Remarks
								Intake	Exhaust	
122	549	ND	70	41	1	0	N	Y	Y	DO
124	555	ND	69	43	2	0	N	Y	Y	DO
125-130	560	ND	70	42	2	0	N	Y	Y	
131-142	563	ND	69	49	2	0	N	Y	Y	Plants
134-139	567	ND	68	48	2	2	N	Y	Y	Plants
143-146	580	ND	69	54	2	1	N	Y	Y	
149	571	ND	69	52	2	1	N	Y	Y	DO
150 Conference Room	607	ND	69	52	1	0	N	Y	Y	Plants
153	469	ND	71	39	10	0	N	Y	Y	
154 File Room	476	ND	71	40	2	0	N	Y	Y	
155 Storage	484	ND	71	40	6	0	N	Y	Y	
156	552	ND	71	40	12	1	N	Y	Y	DO

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								Intake	Exhaust	
161 Kitchen	513	ND	71	40	12	0	N	Y	Y	DO
164 Storage	484	ND	73	35	7	0	N	Y	Y	
165-168	496	ND	73	36	2	0	N	Y	Y	
170-173	522	ND	74	35	8	2	N	Y	Y	
174-177	502	ND	74	35	5	1	N	Y	Y	
178-181	508	ND	74	35	4	1	N	Y	Y	
182	499	ND	74	35	5	0	N	Y	Y	
184-187	507	ND	74	35	7	1	N	Y	Y	
188-191	516	ND	74	36	4	1	N	Y	Y	
193-194	572	ND	74	36	3	0	N	Y	Y	
195	566	ND	73	38	4	0	N	Y	Y	DO
196 Records Room	485	ND	73	37	4	0	N	Y	Y	DO

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								Intake	Exhaust	
199-202	542	ND	72	38	2	3	N	Y	Y	DO
203 A & B	470	ND	72	38	2	0	N	Y	Y	DO
204	511	ND	72	38	7	1	N	Y	Y	DO
206-216	588	ND	72	38	3	0	N	Y	Y	
208-213	615	ND	72	39	4	4	N	Y	Y	
218-220	565	ND	73	38	4	2	N	Y	Y	
221-223	568	ND	72	38	2	0	N	Y	Y	
224	612	ND	72	38	2	1	N	Y	Y	DO
225 Conference Room	551	ND	73	38	2	0	N	Y	Y	DO
226	576	ND	73	38	7	1	N	Y	Y	DO
227	559	ND	73	37	4	1	N	Y	Y	DO

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